

## **REMARKS**

Claims 1-8, 10-16, and 21-28 are pending in the application and stand rejected.

Applicants respectfully request reconsideration of the claim rejections based on the following remarks.

### **Claim Rejections - 35 U.S.C. § 103(a):**

Claims 1-8, 10-16 and 21-28 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Wallace et al. (U.S. Patent 6,277,681) and Schrems et al (U.S. 6,018,174).

In general, the methods of claims 1, 10, and 21 are related to methods for forming a crystalline silicon nitride layer comprising, *inter alia*, the step of *precleaning the exposed surface by employing a hydrogen prebake after an amount of time has elapsed after the removing of a native oxide from the exposed surface...to grow a continuous silicon nitride layer.*

Examiner contends it would have been within the scope of one of ordinary skill in the art to combine the teachings of Wallace and Schrems to employ the process of Schrems to enable formation of the cleaning step. Applicants respectfully disagree.

Applicants respectfully submit that the Examiner's motivation for combining the teachings of Wallace and Schrems is merely conclusory and based upon impermissible hindsight reasoning. In other words, Applicants believe the Examiner is taking the present invention disclosure as a blueprint for piecing together the prior art because the combination of Wallace and Schrems does not suggest a method for forming a crystalline silicon nitride layer using a combination of cleaning steps including a hydrogen pre-bake to prepare a substrate prior to forming a continuous crystalline silicon nitride layer, as essentially claimed in claims 1, 10, and

21.

Examiner correctly notes that Wallace does not disclose precleaning the exposed surface by employing a hydrogen prebake.

In addition, although Schrems may disclose a process for making a capacitor within a trench employing a hydrogen prebake, Schrems discloses the use of a hydrogen prebake to remove a native oxide prior to formation of an epitaxial silicon layer and does not disclose any other cleaning or removing steps, or that the hydrogen pre-bake can be or needs to be combined with any other cleaning or removing steps, or that the hydrogen pre-bake can be *employed ...after the removal of a native oxide from an exposed surface...to grow a continuous silicon nitride layer*, as essentially claimed in claim 1, 10, and 21.

Thus, the combination of Wallace and Schrems does not enable the formation of the cleaning step because the combination of Wallace and Schrems fails to suggest or disclose that a hydrogen pre-bake can be combined with any other cleaning steps or processes prior to forming a continuous crystalline silicon nitride layer or that a hydrogen pre-bake is employed after the removal of a native oxide from an exposed surface.

Therefore, one of ordinary skill in the art would not be motivated to combine the teachings of the cited references to suggest the elements as claimed in claims 1, 10, and 21 for at least the reasons stated above.

Further, the Examiner contends that a duration of delay between the cleaning steps is a matter of routine optimization because between steps there is always a time delay, time spent between process steps is a result effective variable because it results in different yields per time. Applicants respectfully disagree.

Applicants respectfully submit that the delay time is not a matter of routine optimization or general conditions of a claim disclosed in the prior art. Rather, the time delay determines the type of layer to be formed e.g., a continuous crystalline layer, a partial crystalline layer, or an amorphous crystalline, see page 12, lines 4-15. Thus, Applicants respectfully submit that the Examiner has no basis for contending “routine optimization.”

Furthermore, claim 10 is believed to be patentably distinct and non-obvious over the combination of Wallace and Schrems because the combination does not teach or suggest *depositing an amorphous silicon nitride layer over the continuous crystalline silicon nitride layer...to form a node dielectric*, as essentially claimed in claim 10.

It is unclear from the Office Action dated September 25, 2003, whether the Examiner relies on Wallace or Schrems to disclose the features of claim 10 discussed above. However, Applicants believe that the Examiner is relying on Schrems to disclose such features because the Examiner correctly noted in the previous Office Action, dated March 27, 2003, that Wallace does not disclose making a capacitor in a trench.

Although Schrems is related to making a capacitor in a trench, Schrems discloses improving a bottle-shaped capacitor by including a epi layer that serves as a buried plate of the trench capacitor. Indeed, Applicants cannot find the features of claim 10 discussed above in Schrems. Since Schrems does not disclose or suggest *depositing an amorphous silicon nitride layer over the continuous crystalline silicon nitride layer...to form a node dielectric*, as essentially claimed in claim 10, Schrems fails to cure the deficiencies of Wallace.

Even assuming, *arguendo*, that Schrems could be properly combined with Wallace, it is respectfully submitted that the combination of Schrems and Wallace is legally deficient to

establish a prima facie case of obvious because, at the very least, the combination does not suggest or disclosed a method for forming a node dielectric layer in deep trenches comprising, *inter alia, depositing an amorphous silicon nitride layer over the continuous crystalline silicon nitride layer...to form a node dielectric*, as essentially claimed in claim 10.

Therefore, claim 10 is believed to be patentably distinct and non-obvious over Wallace or Schrems for at least the reasons stated above.

Further, claims 2-8 depend from claim 1, claims 11-16 depend from claim 10, and claims 22-28 depend from claim 21. Therefore, the dependent claims are allowable for at least the same reasons as the independent base claims 1, 10, and 21. Accordingly, the withdrawal of the rejection under 35 U.S.C. § 103(a) is respectfully requested.

Respectfully submitted,

By: Thomas W. McNally  
Reg. No. 48,609  
Attorney for Applicant

F.CHAU & ASSOCIATES, LLC  
1900 Hempstead Turnpike, Suite 501  
East Meadow, NY 11554  
Telephone: (516) 357-0091  
Facsimile: (516) 357-0092